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(REV 5-93)

US DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY DOCKET NUMBER  
2000\_0926ATRANSMITTAL LETTER TO THE UNITED STATES  
DESIGNATED/ELECTED OFFICE (DO/EO/US)  
CONCERNING A FILING UNDER 35 U.S.C. §371U.S. APPLICATION NO.  
(37 CFR 1.53)  
097582727International Application No.  
PCT/JP99/06102International Filing Date  
November 2, 1999Priority Date Claimed  
November 2, 1998

## Title of Invention

OPTICAL DISK, APPARATUS FOR PLAYING BACK AND APPARATUS FOR COPYING OPTICAL DISK AND  
METHOD OF PREVENTING ILLEGAL USE OF OPTICAL DISKApplicant(s) For DO/EO/US  
Yoshihiro TOSAKI et al.

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. §371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. §371.
3. ☒ This express request to begin national examination procedures (35 U.S.C. §371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. §371(b) and PCT Articles 22 and 39(1).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☒ A copy of the International Application as filed (35 U.S.C. §371(c)(2))
  - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☒ has been transmitted by the International Bureau. ATTACHMENT A
  - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☒ A translation of the International Application into English (35 U.S.C. §371(c)(2)). ATTACHMENT B
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. §371(c)(3)).
  - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
  - b. ☐ have been transmitted by the International Bureau.
  - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
  - d. ☐ have not been made and will not be made.
8. ☐ An oath or declaration of the inventor(s) (35 U.S.C. §371(c)(4)).
9. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. §371(c)(5)).

## Items 10. to 13. below concern other document(s) or information included:

10. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
11. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
12. ☒ A **FIRST** preliminary amendment. ATTACHMENT C
 

☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
13. ☒ Other items or information:
  - Notification Concerning Submission or Transmittal of Priority Document - ATTACHMENT D
  - International Search Report - ATTACHMENT E
  - unexecuted Declaration and Power of Attorney with Cover Letter - ATTACHMENT F

THE COMMISSIONER IS AUTHORIZED  
TO CHARGE ANY DEFICIENCY IN THE  
FEES FOR THIS PAPER TO DEPOSIT  
NO. 23-0875

| U.S. APPLICATION NO. <b>09/582727</b><br><small>(if known, enter CFR 1.53(a)(1))</small>  |              | INTERNATIONAL APPLICATION NO.<br>PCT/JP99/06102 |            | ATTORNEY'S DOCKET NO.<br>2000 0926A   |    |              |              |  |  |           |  |
|---|--------------|---|------------|---|----|--------------|--------------|--|--|-----------|--|
| 17. <input checked="" type="checkbox"/> The following fees are submitted<br><br><b>BASIC NATIONAL FEE (37 CFR 1.492(a)(1)-(5)):</b><br><br><input checked="" type="checkbox"/> Search Report has been prepared by the EPO or JPO..... \$840.00<br><input type="checkbox"/> Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO..... \$970.00<br><br><b>ENTER APPROPRIATE BASIC FEE AMOUNT =</b>  |              |   |            | <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 50%;">CALCULATIONS</th> <th style="width: 50%;">PTO USE ONLY</th> </tr> <tr> <td colspan="2" style="height: 40px;"></td> </tr> <tr> <td>\$ 840.00</td> <td></td> </tr> </table> |    | CALCULATIONS | PTO USE ONLY |  |  | \$ 840.00 |  |
| CALCULATIONS  | PTO USE ONLY |   |            |   |    |              |              |  |  |           |  |
|   |              |   |            |   |    |              |              |  |  |           |  |
| \$ 840.00   |              |   |            |   |    |              |              |  |  |           |  |
| Surcharge of \$130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)).   |              |   |            | \$  |    |              |              |  |  |           |  |
| Claims  | Number Filed | Number Extra                                    | Rate       |   |    |              |              |  |  |           |  |
| Total Claims  | 55 - 20 =    | 35  | X \$18.00  | \$ 630.00   |    |              |              |  |  |           |  |
| Independent Claims  | 10 - 3 =     | 7   | X \$78.00  | \$ 546.00   |    |              |              |  |  |           |  |
| Multiple dependent claim(s) (if applicable)   |              |   | + \$260.00 | \$  |    |              |              |  |  |           |  |
| <b>TOTAL OF ABOVE CALCULATIONS =</b>  |              |   |            | \$2,016.00  |    |              |              |  |  |           |  |
| Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity Statement must also be filed.<br>(Note 37 CFR 1.9, 1.27, 1.28)  |              |   |            | \$  |    |              |              |  |  |           |  |
| <b>SUBTOTAL =</b>   |              |   |            | \$2,016.00  |    |              |              |  |  |           |  |
| Processing fee of \$130.00 for furnishing the English translation later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)).  |              |   |            | \$  |    |              |              |  |  |           |  |
| <b>TOTAL NATIONAL FEE =</b>   |              |   |            | \$2,016.00  |    |              |              |  |  |           |  |
| Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40 per property +   |              |   |            | \$  |    |              |              |  |  |           |  |
| <b>TOTAL FEES ENCLOSED =</b>  |              |   |            | \$2,016.00  |    |              |              |  |  |           |  |
|   |              |   |            | Amount to be refunded   | \$ |              |              |  |  |           |  |
|   |              |   |            | Amount to be charged  | \$ |              |              |  |  |           |  |
| <p>a. <input checked="" type="checkbox"/> A check in the amount of \$2,016.00 to cover the above fees is enclosed. A duplicate copy of this form is enclosed.</p> <p>b. <input type="checkbox"/> Please charge my Deposit Account No. 23-0975 in the amount of \$_____ to cover the above fees. A duplicate copy of this sheet is enclosed.</p> <p>c. <input checked="" type="checkbox"/> The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 23-0975.</p> <p><b>NOTE:</b> Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.</p> <div style="display: flex; justify-content: space-between; margin-top: 20px;"> <div style="width: 45%;"> <p>SEND ALL CORRESPONDENCE TO:</p> <p>WENDEROTH, LIND &amp; PONACK, L.L.P.<br/>           2033 K Street, N.W., Ste. 800<br/>           Washington, D.C. 20006</p> </div> <div style="width: 50%; text-align: center;"> <p><u><i>Charles R. Watts</i></u><br/>           SIGNATURE</p> <p><u>Charles R. Watts</u><br/>           NAME</p> <p><u>33,142</u><br/>           REGISTRATION NUMBER</p> </div> </div> <p>June 30, 2000</p> |              |   |            |   |    |              |              |  |  |           |  |

[CHECK NO. 38759]  
 [2000\_0926A]

532 Rec'd PCT/PTC 30 JUN 2000

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of :  
Yoshihiro TOSAKI et al. : Attn: BOX PCT  
Serial No. NEW : Docket No. 2000\_0926A  
Filed June 30, 2000 :

OPTICAL DISK, APPARATUS FOR  
PLAYING BACK AND APPARATUS FOR  
COPYING OPTICAL DISK AND METHOD  
OF PREVENTING ILLEGAL USE OF  
OPTICAL DISK

[Corresponding to PCT/JP99/06102  
Filed November 2, 1999]

PRELIMINARY AMENDMENT

Assistant Commissioner for Patents,  
Washington, DC 20231

Sir:

Please amend the above-identified application as follows.

In the Claims:

Kindly amend claims 4-7, 10, 14, 22-25, 29 and 32 as follows.

Claim 4, line 2, change "to any one of claims 1 to 3" to --to claim 1--;

Claim 5, line 2, change "to any one of claims 1 to 3" to --to claim 1--;

Claim 6, line 2, change "to any one of claims 1 to 3" to --to claim 1--;

Claim 7, line 2, change "to any one of claims 1 to 3" to --to claim 1--;

Claim 10, line 2, delete "or 9";

Claim 14, line 1, change "to any one of claims 11 to" to --to claim 11--;

line 2, delete "13";

Claim 22, line 2, change "to any one of claims 19 to 21" to --to claim 19--;

Claim 23, line 2, change "to any one of claims 19 to 21" to --to claim 19--;

Claim 24, line 2, change "to any one of claims 19 to 21" to --to claim 19--;

ATTACHMENT C

Claim 25, line 2, change "to any one of claims 19 to 21" to --to claim 19--;

Claim 29, line 2, change "to any one of claims 26 to 28" to --to claim 26--;

Claim 32, line 2, delete "or 31".

Kindly add new claims 34-54 as follows.

34. The apparatus for playing back the optical disk according to claim 2, wherein the disk judging means detects whether the groove is provided with a wobble or not, and then judges that the optical disk is writable if the wobble is detected.

35. The apparatus for playing back the optical disk according to claim 3 wherein the disk judging means detects whether the groove is provided with a wobble or not, and then judges that the optical disk is writable if the wobble is detected.

36. The apparatus for playing back the optical disk according to claim 2, wherein the disk judging means detects whether the subaltern information region is provided with a sub-groove portion which connects a predetermined portion of the groove to an adjacent portion of the groove or not, and then judges that the optical disk is writable if the sub-groove portion is detected.

37. The apparatus for playing back the optical disk according to claim 3, wherein the disk judging means detects whether the subaltern information region is provided with a sub-groove portion which connects a predetermined portion of the groove to an adjacent portion of the groove or not, and then judges that the optical disk is writable if the sub-groove portion is detected.

38. The apparatus for playing back the optical disk according to claim 2, wherein the disk judging means detects whether another subaltern information region provided on the optical disk, which is different from said subaltern information region, is provided with a code indicating

that the optical disk is writable, or not, and then judges that the optical disk is writable if the code is detected.

39. The apparatus for playing back the optical disk according to claim 3 wherein the disk judging means detects whether another subaltern information region provided on the optical disk, which is different from said subaltern information region, is provided with a code indicating that the optical disk is writable, or not, and then judges that the optical disk is writable if the code is detected.

40. The apparatus for playing back the optical disk according to claim 2, wherein the disk judging means detects at least one of whether the groove is provided with a wobble or not, whether the subaltern information region is provided with a sub-groove portion which connects a predetermined portion of the groove to an adjacent portion of the groove or not, and whether another subaltern information region provided on the optical disk, which is different from said subaltern information region, is provided with a code indicating that the optical disk is writable, or not, and then judges that the optical disk is writable if at least one of the wobble, sub-groove portion and the code is detected.

41. The apparatus for playing back the optical disk according to claim 3, wherein the disk judging means detects at least one of whether the groove is provided with a wobble or not, whether the subaltern information region is provided with a sub-groove portion which connects a predetermined portion of the groove to an adjacent portion of the groove or not, and whether another subaltern information region provided on the optical disk, which is different from said subaltern information region, is provided with a code indicating that the optical disk is writable, or not, and then judges that the optical disk is writable if at least one of the wobble, sub-groove portion and the code is detected.

42. The apparatus for copying the optical disk according to claim 9, wherein the disk copy preventing means prevents the data information from being copied by preventing the data information from being deciphered.

43. The optical disk according to claim 12, wherein the disk control information in the first subaltern information region and the disk control information in the second subaltern information region are formed by means of different recording methods to each other.

44. The optical disk according to claim 13, wherein the disk control information in the first subaltern information region and the disk control information in the second subaltern information region are formed by means of different recording methods to each other.

45. The method of preventing the illegal use of the optical disk according to claim 20, wherein said other information than the disk control information is such information of whether the groove is provided with a wobble or not, while  
it is judged that the optical disk is writable if the wobble is detected.

46. The method of preventing the illegal use of the optical disk according to claim 21, wherein said other information than the disk control information is such information of whether the groove is provided with a wobble or not, while  
it is judged that the optical disk is writable if the wobble is detected.

47. The method of preventing the illegal use of the optical disk according to claim 20, wherein said other information than the disk control information is such information of whether the subaltern information region is provided with a sub-groove portion which connects a predetermined portion of the groove to an adjacent portion of the groove or not, while  
it is judged that the optical disk is writable if the sub-groove portion is detected.

48. The method of preventing the illegal use of the optical disk according to claim 21, wherein said other information than the disk control information is such information of whether the subaltern information region is provided with a sub-groove portion which connects a predetermined portion of the groove to an adjacent portion of the groove or not, while  
it is judged that the optical disk is writable if the sub-groove portion is detected.

49. The method of preventing the illegal use of the optical disk according to claim 20, wherein said other information than the disk control information is such information of whether another subaltern information region which is different from said subaltern information region, is provided with a code indicating that the optical disk is writable, or not, while it is judged that the optical is writable if the code is detected.

50. The method of preventing the illegal use of the optical disk according to claim 21, wherein said other information than the disk control information is such information of whether another subaltern information region which is different from said subaltern information region, is provided with a code indicating that the optical disk is writable, or not, while it is judged that the optical is writable if the code is detected.

51. The method of preventing the illegal use of the optical disk according to claim 20, wherein said other information than the disk control information is at least one in such information set of whether the groove is provided with a wobble or not, whether the subaltern information region is provided with a sub-groove portion which connects a predetermined portion of the groove to an adjacent portion of the groove or not, and whether another subaltern information region which is different from said subaltern information region, is provided with a code indicating that the optical disk is writable, or not, while it is judged that the optical disk is writable if at least one of the wobble, the sub-groove and the code is detected.

52. The method of preventing the illegal use of the optical disk according to claim 21, wherein said other information than the disk control information is at least one in such information set of whether the groove is provided with a wobble or not, whether the subaltern information region is provided with a sub-groove portion which connects a predetermined portion of the groove to an adjacent portion of the groove or not, and whether another subaltern information region which is different from said subaltern information region, is provided with a code indicating that the optical disk is writable, or not, while

it is judged that the optical disk is writable if at least one of the wobble, the sub-groove and the code is detected.

53. The method of preventing the illegal use of the optical disk according to claim 27, wherein the optical disk is a write-once optical disk.

54. The method of preventing the illegal use of the optical disk according to claim 28, wherein the optical disk is a write-once optical disk.

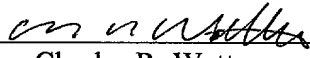
55. The method of preventing the illegal use of the optical disk according to claim 31, wherein the optical disk is a write-one optical disk.

#### **REMARKS**

The above claim amendments are presented in order to remove multiple claim dependency, so as to reduce the required filing fee.

Respectfully submitted,

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## SPECIFICATION

OPTICAL DISK, APPARATUS FOR PLAYING BACK AND APPARATUS  
FOR COPYING OPTICAL DISK AND METHOD OF PREVENTING ILLEGAL  
USE OF OPTICAL DISK

5

## Technical Field

The present invention relates to an optical disk, an  
apparatus for playing back and apparatus for copying the  
optical disk, and a method of preventing an illegal use of  
10 the optical disk, in particular, relates to a circular  
optical disk (recording medium) in which record signals  
such as images or voices are ciphered and recorded in order  
to protect their copyrights against illegal copies thereof,  
and to an apparatus for playing back or copying the optical  
15 disk.

## Background Art

In general, in a DVD disk on the market, in which a  
movie, music or the like is collected (recorded), data  
20 information such as images, voices or the like is ciphered  
and recorded in order to protect its copyright against an  
illegal use thereof. Thus, when the DVD disk is played  
back using a DVD player, the DVD player plays back it by  
reading key information recorded in a subaltern information  
25 region of the same DVD disk, and deciphering the ciphered

data information using the key information to reconstruct the original images, voices or the like.

Hereinafter, a conventional DVD disk and a disk player of the above-mentioned type will be described. Fig. 12 is a perspective view showing a rough construction of the above-mentioned conventional DVD disk. In Fig. 12, 101 denotes the DVD disk. 102 denotes a main information region of the DVD disk 101. Data information such as images, voices or the like is generally ciphered and recorded in the main information region 102. 103 denotes a key information region which records key information for deciphering the data information recorded in the main information region 102. The key information region 103 is located at an inner periphery side in the DVD disk 101.

Fig. 11 is a block diagram showing a rough construction of the conventional DVD player. In Fig. 11, 101 denotes the DVD disk shown in Fig. 12 also, which records the data information such as images or voices to be played back. 104 denotes an optical pickup which reads record signals of the DVD disk 101 using a laser ray. 105 denotes a transfer controller which moves the optical pickup 104 in the radial direction of the DVD disk 101 in order to read the record signals at arbitrary positions on the DVD disk 101. 106 denotes a disk motor which rotates the DVD disk 101. 107 denotes a first control circuit

which controls the optical pickup 104, the transfer controller 105 and the disk motor 106. 108 denotes an amplifier which amplifies the signals which have been read by the optical pickup 104. 109 denotes a second control circuit into which the output signals of the amplifier 108 are inputted. Based on the signals, the second control circuit generates servo signals such as focus error signals or tracking error signals, which are required when the optical pickup 104 reads the DVD disk 101, and then outputs them to the first control circuit 107. Further, the second control circuit 109 digitizes (makes binary) the input signals of analog type. 110 denotes a demodulation circuit which analyzes the signals which have been read from the DVD disk 101 and digitized, and reconstructs the data information such as the original images or music. 111 denotes a system control circuit which controls the whole DVD player.

Hereinafter, actions of the DVD player having the above-mentioned construction will be described. When the DVD disk on the market is played back, at first, the transfer controller 105 is driven by the first control circuit 107 in accordance with the instruction of the system control circuit 111 so as to move the optical pickup 104 to an inner periphery side in the DVD disk 101. The signals which have been read by the optical pickup 104, are

amplified by the amplifier 108, and further digitized by the second control circuit 109. Then, the contents of the signals are read by the demodulation circuit 110. The modulation circuit 110 sends the results to the system control circuit 111. Then, the system control circuit 111 outputs another instruction to the first control circuit 107 again, if the read contents do not include the key information of the key information recording region 103 (see Fig. 12). Thus, the transfer controller 105 is driven by the first control circuit 107 so as to move the optical pickup 104 to more inner position in the DVD disk 101, and then the key information is searched.

The key information recorded in the inner portion of the DVD disk 101 is found out by repeating the above-mentioned actions so that the information is read by the demodulation circuit 110. If the system control circuit 111 detects that the modulation circuit 110 has read the key information of the DVD disk 101, the transfer controller 105 is driven by the first control circuit 107 in accordance with the instruction of the system control circuit 111 so as to move the optical pickup 104 to an outer periphery side. Then, the optical pickup 104 reads the record signals in the main information region 102 of the DVD disk 101 (see Fig. 12). Because the record signals are generally ciphered, normal image signals or voice

signals cannot be obtained if the record signals are played back as they stand. However, the record signals can be deciphered if the key information, which is recorded in the key information recording region 103 and has been read, is used. Thus, the demodulation circuit 110 deciphers the record signals of the main information region 102 using the key information which has been read so as to reconstruct the original and normal image data or voice data.

However, in the writable optical disk such as a DVD-R or the like, a copy of the optical disk may be easily produced by copying the subaltern information region, too. As a physical means for preventing it, there has been proposed such a method to form other information previously by means of pre-pits in the key information region.

The above-mentioned pre-pits will be described with reference to Fig. 9. Fig. 9 shows a section which is made by cutting a DVD disk 1 on the market along its radial direction, and the recording condition of the information therein. In Fig. 9, the left side is the inner periphery side of the disk, while the right side is the outer periphery side of the disk. Hereupon, 32 denotes a main information region (main recording region), while 33 denotes a key information recording region. Further, 43 denotes first key information, which is recorded in the key information recording region 33. 44 denotes a main data,

which is recorded in the main information region 32. Although the main data 44 such as an image data or a music data is ciphered, it can be deciphered by using the first key information 43.

5           45 denotes a writable DVD disk (DVD-R disk). In the main information region 32 of the disk, signals can be freely recorded. 46 denotes other key information (second key information) which has been previously formed by means of pre-pits instead of the normal key information. The  
10 other key information has been previously recorded in the key information recording region 33 of the writable DVD disk 45 in such a manner that it cannot be rewritten. The second key information 46 is a data which is not available for the use of deciphering the cipher. That is, the second  
15 key information cannot decipher the cipher of any the main data 44. Meanwhile, the contents in the main data 44 recorded in the main information region 32 of the writable DVD disk 45 are quite as same as those in the main data 44 of the original DVD disk 1.

20           However, even if someone intends to play back the writable DVD disk 45 using the above-mentioned DVD player, the second key information 46 recorded in the key information recording region 33 disposed at a predetermined position in the inner periphery portion of the writable DVD  
25 disk is the unavailable data which is different from the

original data for deciphering the cipher, as described above. Therefore, even if the unavailable key information is used, the ciphered data cannot be reconstructed to the original and normal image signals or voice signals. In consequence, it is designed that the illegally copied writable DVD disk cannot be played back.

Although the illegal copy can be prevented in the ordinary apparatus as described above, it is probable that the key information as well as the data information is also copied into the main information region by using a remodeled drive or the like. Hereinafter, there will be described such a case that not only the main data but also the key information is copied and recorded in the main information region of the writable DVD disk.

Fig. 10 is a view showing a read only DVD disk on the market, which is the original of copying and has normal key information only. Hereupon, Fig. 10 shows such a state that the key information and the contents of the writable DVD disk on the market, in which a movie, music or the like is collected, are copied to the main information region.

As shown in Fig. 10, both of the main data 44 and the first key information 43 of the original DVD disk 1 is copied and recorded in the main information region 32 of the writable DVD disk 45. Although the second key information 46, which is the original key information, has

been previously recorded in the key information recording region 33 of the writable DVD disk 45, the second key information 46 is the unavailable data for deciphering the data of the main information region 32, as described above.

5 In this case, it is impossible to decipher the main data 44 using the second key information 46 located at the predetermined position. However, it is possible to decipher the cipher, if the first key information 43 recorded in the main information region 32, which is not  
10 located at the predetermined position, is used.

Hereinafter, there will be described such a case that a writable DVD disk is played back using a DVD player with reference to Fig. 3 for the later-mentioned Embodiment 3 or 4 of the present invention for the convenience' sake. In  
15 Fig. 3, at first, the transfer controller 4 is driven by the first control means 6 in accordance with the second control means 9 so as to move the optical pickup 3 to the second subaltern information region located at the most inner periphery side of the DVD disk 1. The optical pickup  
20 3 reads disk information signals such as the disk type information and positional information of the first subaltern information region, which are stored in the second subaltern information region. The signals are amplified by the amplifier 5. Further, the contents of the  
25 signals are detected by the demodulation means 7, and then



judged by the disk judging means 14. In accordance with the read positional information of the first subaltern information region, the second control means 9 and the first control means 6 drive the transfer controller 4 and  
5 make the controller move the optical pickup 3. Thus, the disk control information, which includes the key data of the first subaltern information region located at the normal position, is read.

However, in the conventional playback system or copy  
10 system for the DVD disk, if each of the ciphered data information such as a movie or music and the key information for deciphering the data information in the DVD disk on the market is copied to the DVD-R or RW disk, each of which is a user-writable DVD disk, it is probable that  
15 the ciphered data information may be deciphered to be played back on the basis of the key information which has been copied to the writable DVD disk. In consequence, in the conventional system, there exists such a problem that illegal uses of the DVD disk or other optical disks, which  
20 infringe the copyrights, cannot be effectively prevented.

#### Disclosure Of Invention

The present invention is achieved to solve the conventional problem described above. The problem to be  
25 solved is to provide an optical disk, an apparatus for

playing back or apparatus for copying the optical disk, or  
a method of preventing an illegal use of the optical disk,  
which can effectively prevent the illegal use of the DVD  
disk or other optical disks physically or electrically,  
5 which infringes the copyright.

An optical disk, an apparatus for playing back and  
apparatus for copying the optical disk, and a method of  
preventing an illegal use of the optical disk, according to  
the present invention which has been achieved to solve the  
10 above-mentioned problem, are fundamentally characterized in  
that they include one of the following elements or a  
combination of any ones of the elements.

(1) Whether an optical disk is writable or not, is  
judged in accordance with another disk signal than disk  
15 control information.

(2) An alteration of data is prevented by physically  
forming a subaltern information region including key  
information by means of pre-pits.

(3) An alteration of data is prevented by physically  
20 forming a sub-groove portion in a subaltern information  
region including key information.

(4) A second subaltern information region is provided  
at an inner side position in comparison with a first  
subaltern information region, and disk control information  
25 is divided and stored in the regions.

(5) Key information is stored in a first subaltern information region, positional information of the first subaltern information region is stored in a second subaltern information region, and regular key information is identified by reading the positional information.

More concretely, according to the present invention, (a) an apparatus for playing back an optical disk having a groove, which includes a main information region in which ciphered data information is recorded in the groove, and a subaltern information region for recording disk control information including key information for deciphering the data information, is characterized in that it includes (b) a protective condition judging means for judging whether the data information is protected by a copyright or not on the basis of the disk control information when the data information is played back, (c) a disk judging means for judging whether the optical disk is writable or not on the basis of other information than the disk control information when the data information is played back, and (d) a disk playback preventing means for preventing the optical disk from being played back if it is judged that the data information is protected by the copyright by the protective condition judging means and it is judged that the optical disk is writable by the disk judging means.

As the optical disk used herein, for example, a write-

once optical disk may be mentioned. In the apparatus for playing back the optical disk, it is preferable that the disk playback preventing means prevents the optical disk from being played back by preventing the data information  
5 from being deciphered.

Meanwhile, in the apparatus for playing back the optical disk, it is preferable that the disk judging means detects at least one of (a) whether the groove is provided with a wobble or not, (b) whether the subaltern information  
10 region is provided with a sub-groove portion which connects a predetermined portion of the groove to an adjacent portion of the groove or not, and (c) whether another subaltern information region provided on the optical disk, which is different from said subaltern information region, is  
15 provided with a code indicating that the optical disk is writable, or not, (d) and then judges that the optical disk is writable if at least one of the wobble, sub-groove portion and the code is detected.

According to the present invention, (a) an apparatus  
20 for copying ciphered data information recorded in a first optical disk to a second optical disk of writable type, in which the first optical disk has a main information region for recording the ciphered data information and a subaltern information region for recording disk control information  
25 including key information for deciphering the ciphered data

information, is characterized in that it includes (b) a protective condition judging means for judging whether the data information is protected by a copyright or not on the basis of the disk control information when the data information is copied, and (c) a disk copy preventing means for preventing the data information recorded in the first optical disk from being copied to the second optical disk if it is judged that the data information is protected by the copyright by the protective condition judging means.

10 As the optical disk used herein, for example, a write-once optical disk may be mentioned. In the apparatus for copying the optical disk, it is preferable that the disk copy preventing means prevents the data information from being copied by preventing the data information from being  
15 deciphered.

An optical disk of writable type according to the present invention, including (a) a main information region for recording ciphered data information, in which the data information is recorded in a recording layer within a groove extending along a spiral track, in such a manner that the data information can be read using light, (b) a first subaltern information region located at an inner periphery side in comparison with the main information region, and (c) a second subaltern information region  
20 located at an inner periphery side in comparison with the  
25

first subaltern information region, is characterized in that (d) a disk control information recorded in a subaltern information region of a read only optical disk is prevented from being copied to the first subaltern information region, by dividing disk control information including key information for deciphering the data information into two parts, and recording the parts in the first subaltern information region and the second subaltern information region, respectively.

As the optical disk used herein, for example, a write-once optical disk may be mentioned.

In the optical disk, it is preferable that the disk control information including the key information for deciphering the data information is recorded in the first subaltern information region, while at least positional information of the first subaltern information region is recorded in the second subaltern information region. Further, it is more preferable that the disk control information in the first subaltern information region and the disk control information in the second subaltern information region are formed by means of different recording methods to each other.

Meanwhile, in the optical disk, it is preferable that the disk control information in the first subaltern information region is formed by means of pre-pits. Further,

it is more preferable that the disk control information in the second subaltern information region is formed by means of a laser trimming process. Because the laser trimming process can be performed after the disk has been completed, 5 key information of the copyright holder and disk ID information etc. can be also recorded.

Another optical disk of writable type according to the present invention, including (a) a main information region for recording ciphered data information, in which the data 10 information is recorded in a recording layer within a groove extending along a spiral track, in such a manner that the data information can be read using light, (b) a first subaltern information region located at an inner periphery side in comparison with the main information 15 region, and (c) a second subaltern information region located at an inner periphery side in comparison with the first subaltern information region, is characterized in that (d) disk control information recorded in a subaltern information region of a read only optical disk is prevented 20 from being copied to the first subaltern information region or to the main information region, by providing a sub-groove portion, which connects a predetermined portion of the groove to an adjacent portion of the groove, in the first subaltern information region. As the optical disk 25 used herein, for example, a write-once optical disk may be

mentioned.

According to the present invention, a method of preventing an illegal use of an optical disk having a groove, (a) which includes a main information region in which  
5 ciphered data information is recorded in the groove, and a subaltern information region for recording disk control information including key information for deciphering the data information, is characterized in that it includes the steps of (b) judging whether the data information is  
10 protected by a copyright or not on the basis of the disk control information when the data information is played back, (c) judging whether the optical disk is writable or not on the basis of other information than the disk control information, and (d) preventing the optical disk from being  
15 played back if the data information is protected by the copyright and the optical disk is writable. As the optical disk used herein, for example, a write-once optical disk may be mentioned.

In the method of preventing the illegal use of the  
20 optical disk, it is preferable that the optical disk is prevented from being played back by preventing the data information from being deciphered.

Meanwhile, in the method of preventing the illegal use of the optical disk, it is preferable that the other  
25 information than the disk control information is at least



one in such information set of (a) whether the groove is provided with a wobble or not, (b) whether the subaltern information region is provided with a sub-groove portion which connects a predetermined portion of the groove to an adjacent portion of the groove or not, and (c) whether another subaltern information region which is different from said subaltern information region, is provided with a code indicating that the optical disk is writable, or not, while (d) it is judged that the optical disk is writable if at least one of the wobble, the sub-groove and the code is detected.

According to the present invention, another method of preventing an illegal use of optical disks when ciphered data information recorded in a first optical disk is copied to a second optical disk of writable type, (a) in which first optical disk has a main information region for recording the ciphered data information and a subaltern information region for recording disk control information including key information for deciphering the ciphered data information, is characterized in that it includes the steps of (b) judging whether the data information is protected by a copyright or not on the basis of the disk control information, and (c) preventing the data information recorded in the first optical disk from being copied to the optical disk of writable type if the data information is

protected by the copyright. As the optical disk used herein, for example, a write-once optical disk may be mentioned.

According to the present invention, a further method of preventing an illegal use of an optical disk of writable type having (a) a main information region for recording  
5      ciphered data information which is recorded in a recording layer within a groove extending along a spiral track in such a manner that the data information can be read using light, a first subaltern information region located at an  
10     inner periphery side in comparison with the main information region, and a second subaltern information region located at an inner periphery side in comparison with the first subaltern information region, is characterized in that it includes the step of (b)  
15     preventing disk control information recorded in a subaltern information region of a read only optical disk from being copied to the first subaltern information region of the optical disk of writable type, (c) by previously forming the disk control information of the first subaltern  
20     information region by means of pre-pits or (d) by providing a sub-groove, which connects a predetermined portion of the groove to an adjacent portion of the groove, in the first subaltern information region. As the optical disk used herein, for example, a write-once optical disk may be  
25     mentioned.

According to the present invention, a much further method of preventing an illegal use of an optical disk of writable type having (a) a main information region for recording ciphered data information which is recorded in a recording layer within a groove extending along a spiral track in such a manner that the data information can be read using light, a first subaltern information region located at an inner periphery side in comparison with the main information region, and a second subaltern information region located at an inner periphery side in comparison with the first subaltern information region, is characterized in that it includes the steps of (b) preventing disk control information recorded in a subaltern information region of a read only optical disk from being copied to the first subaltern information region of the optical disk of writable type, by previously forming the disk control information of the first subaltern information region by means of pre-pits or by providing a sub-groove, which connects a predetermined portion of the groove to an adjacent portion of the groove, in the first subaltern information region, (c) judging whether the data information recorded in the optical disk of writable type is protected by a copyright or not on the basis of the disk control information recorded in the first subaltern information region when the data information is played back,

and (d) preventing the optical disk from being played back if the data information is protected by the copyright. As the optical disk used herein, for example, a write-once optical disk may be mentioned.

5           In the method of preventing the illegal use of the optical disk, it is preferable that the optical disk is prevented from being played back by preventing the data information from being deciphered.

10           According to any one of the optical disk, the apparatus for playing back or copying the optical disk, and the method of preventing the illegal use of the optical disk, an illegal use of the optical disk such as a DVD disk, which may infringe the copyright, can be physically or electrically prevented with a good efficiency.

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#### Brief Description Of Drawings

Fig. 1 is a block diagram of a DVD player according to Embodiment 1 of the present invention.

20           Fig. 2 is a block diagram of a DVD player according to Embodiment 2 of the present invention.

Fig. 3 is a block diagram of a DVD player according to Embodiment 3 or 4 of the present invention.

Fig. 4 is a block diagram of a DVD player according to Embodiment 5 of the present invention.

25           Fig. 5 is a partially sectioned perspective view of a

DVD disk provided with a wobble.

Fig. 6 is a partially sectioned perspective view of a DVD disk provided with a sub-groove portion.

Fig. 7A is a plan view of a DVD disk provided with a disk judging code, while Fig. 7B is a side view of the DVD disk shown in Fig. 7A.

Fig. 8 is a partially sectioned perspective view of a DVD disk provided with pre-pits.

Fig. 9 is a view showing a recording structure of a DVD disk on the market.

Fig. 10 is a view showing a recording structure when key information and contents of a DVD disk on the market are copied in a writable DVD disk.

Fig. 11 is a block diagram of a conventional DVD player.

Fig. 12 is a perspective view of a conventional DVD disk.

#### Best Mode for Carrying Out the Invention

Hereinafter, embodiments of the present invention will be concretely described.

(Embodiment 1)

Hereinafter, Embodiment 1 will be described while taking the case that a DVD disk is played back, fundamentally, with reference to Fig. 1 and Fig. 5. In

Embodiment 1, whether a DVD disk to be played back is a writable DVD disk or not, is judged in accordance with whether the disk is provided with a wobble or not.

Fig. 1 is a block diagram showing the construction of the conventional DVD player according to the present invention. In Fig. 1, 1 denotes the DVD disk which records data information such as images or voices to be played back. In the DVD disk 1, the data information is ciphered and recorded in order to generally protect its copyright from an illegal copy, in consequence key information for deciphering the data information is also recorded in a predetermined region on the DVD disk 1.

Meanwhile, 3 denotes an optical pickup which reads record signals of the DVD disk 1 using a laser ray. 4 denotes a transfer controller which moves the optical pickup 3 in the radial direction of the DVD disk 1 in order to read the record signals at arbitrary positions on the DVD disk 1. 2 denotes a disk motor which rotates the DVD disk 1. 6 denotes a first control means which controls the optical pickup 3, the transfer controller 4 and the disk motor 2. 5 denotes an amplifier which amplifies the signals which have been read by the optical pickup 3. 7 denotes a demodulation means which analyzes the signals which have been read from the DVD disk 1 and digitized, and reconstructs the data such as the original images or music.

10 denotes a wobble detecting means which generates and detects a wobble signal obtained from the focus error signal, the tracking error signal or the like. The concrete construction of the wobble will be described later (see Fig. 5). 9 denotes a second control means which includes a protective condition judging means 13 into which a signal is inputted from the modulation means 7, and a disk judging means 14 into which a signal is inputted from the wobble detecting means 10. The protective condition judging means 13 extracts and judges a code indicating existence of a copyright protection from disk control information in the detected signals which are demodulated. The disk judging means 14 judges whether the DVD disk 1 is a writable DVD disk or not, in accordance with the existence of the wobble signal.

15 denotes a playback preventing means which receives the judgement results of the protective condition judging means 13 and the disk judging means 14. Thus, the playback preventing means 15 prevents the signal obtained by demodulating the data information from being outputted from an output means 8, if the data information of the DVD disk 1 is protected by the copyright and the DVD disk 1 is writable.

Fig. 5 is a partially sectioned perspective view of a write-once DVD disk with a wobble. As shown in Fig. 5, in the DVD disk 1a, a groove 21 (groove portion) or its track

(spiral), which is formed on a surface of a substrate 20, meanders. The meandering structure (state) of the groove 21 is referred to the wobble 23. Hereupon, a land portion 22 is formed between a portion of the groove 21 and an adjacent portion of the groove 21 in the radial direction of the disk.

As described above, in the DVD player according to Embodiment 1, it is judged whether the groove 21 is provided with the groove 23 or not. Then, it is judged that the DVD disk 1 is a writable optical disk if the wobble 23 is detected. Thus, if the data information is protected by the copyright, the playback of the DVD disk is prevented. Therefore, an illegal use of the DVD disk, which infringes the copyright, may be effectively prevented in the physical or electrical manner.

(Embodiment 2)

Hereinafter, Embodiment 2 will be described while taking the case that a DVD disk is played back, fundamentally, with reference to Fig. 2 and Fig. 6. In Embodiment 2, it is judged whether a DVD disk to be played back is a writable DVD disk or not, in accordance with existence of a sub-groove portion. Hereupon, fundamental portions in Fig. 2 and Fig. 6 are common with those in Fig. 1 and Fig. 5, respectively. Therefore, in order to avoid duplicated descriptions, the members or elements, which are



common with the both figures, are given the same reference numbers, and then the description as to the members or elements are omitted.

As shown in Fig. 2, in Embodiment 2, the wobble  
5 detecting means 10, which is provided in Embodiment 1, is not provided. Instead of that, a sub-groove portion detecting means 11 is provided. Thus, the sub-groove  
portion detecting means 11 generates and detects a signal  
10 from the sub-groove portion obtained from the focus error signal, the tracking error signal or the like. The other construction is as same as that of the DVD player according to Embodiment 1 (Fig. 1). The concrete construction of the sub-groove portion will be descried later (see Fig. 6).

Thus, in the DVD player according to Embodiment 2, the  
15 second control means 9 includes the protective condition judging means 13 into which a signal from the demodulation means 7 is inputted, and the disk judging means 14 into which a signal from the sub-groove portion detecting means 11 is inputted. Then, the protective condition judging  
20 means 13 extracts and judges a code indicating existence of the copyright protection from the disk control information in the detected signals which are demodulated, while the disk judging means 14 judges whether the DVD disk is a writable DVD disk or not, in accordance with existence of  
25 the signal from the sub-groove portion. The playback

preventing means 15 receives the judgement results of the protective condition judging means 13 and the disk judging means 14, and then prevents the signal obtained by demodulating the data information from being outputted from the output means 8 if the data information is protected by the copyright and if the DVD disk is writable. Hereupon, if the incident rays arrive at the sub-groove portion, the optical pickup moves to an adjacent portion of the groove via the sub-groove portion, in accordance with the control signal from the tracking error signal. Therefore, it may be also possible to make the read of the disk control information such as the key information etc. impossible, by providing the sub-groove portion.

Fig. 6 is a partially sectioned perspective view of a write-once DVD disk provided with a sub-groove portion. As shown in Fig. 6, in the DVD disk 1b, on a surface of the substrate 20 (subaltern information region), there is formed a sub-groove 24 which connects a predetermined position of the groove 21 to an inner side adjacent position of the groove 21. Thus, in the DVD player, it is judged whether the DVD disk is writable or not, in accordance with existence of the sub-groove portion 24. At the occasion, in the recording apparatus or the copying apparatus, it may be possible to make the read of the key information impossible by providing the sub-groove portion before the control

information region for preventing the copy of the key information or the like. Then it may be possible to strengthen the copy preventing function by moving the pickup to the former position after having passed through a certain region. Hereupon, the pickup is moved by means of another sub-groove portion which leads the pickup to the former position, or by means of the track jump.

As described above, in the DVD player according to Embodiment 2, it is detected whether the sub-groove portion 24 exists or not. If the sub-groove portion 24 is detected, it is judged that the DVD disk 1 is a writable optical disk. Then, if the data information is protected by the copyright, the playback of the DVD disk is prevented. Therefore, an illegal use of the DVD disk, which infringe the copyright, may be effectively prevented in the physical or electrical manner.

(Embodiment 3)

Hereinafter, Embodiment 3 will be described while taking the case that a DVD disk is played back, fundamentally, with reference to Fig. 3 and Fig. 7. In Embodiment 3, it is judged whether a DVD disk to be played back is a writable DVD disk or not, in accordance with whether a second subaltern information region (inner periphery side in comparison with a first subaltern information region), which is different from a first

subaltern information region (ordinary subaltern information region), is provided with a code (hereinafter, referred to "disk judging code") indicating that the DVD disk is writable, or not. Hereupon, fundamental portions in Fig. 3  
5 are common with those in Fig. 1. Therefore, in order to avoid duplicated descriptions, the members or elements, which are common with the both figures, are given the same reference numbers, and then the description as to the members or elements are omitted.

10 As shown in Fig. 3, in Embodiment 3, the disk judging means 14 composing the second control means 9 judges whether the disk judging code, which indicates that the DVD disk is writable, exists or not in the second subaltern information region, on the basis of the signal inputted from the  
15 demodulation means 7. The other construction is as same as that of the DVD player according to Embodiment 1 (Fig. 1). The concrete construction of the second subaltern information region will be described later (see Fig. 7).

Thus, in the DVD player according to Embodiment 3, the  
20 protective condition judging means 13 composing the second control means 9 extracts and judges a code indicating existence of the copyright protection from the disk control information in the detected signals which are demodulated, while the disk judging means 14 judges whether the DVD disk  
25 is a writable DVD disk or not, in accordance with existence

of the disk judging code. The playback preventing means 15 receives the judgement results of the protective condition judging means 13 and the disk judging means 14, and then prevents the signal obtained by demodulating the data information from being outputted from the output means 8 if the data information is protected by the copyright and if the DVD disk is writable.

Fig. 7A and Fig. 7B are a plan view and a side view of a write-once DVD disk provided with a second subaltern information region, respectively. As shown in Fig. 7A and Fig. 7B, in the DVD disk 1c, there are provided a main information region 26 for recording ciphered data information which is recorded in a recording layer within a groove extending along a spiral track in such a manner that the data information can be read using light, a first subaltern information region 27 located at an inner periphery side in comparison with the main information region 26, and a second subaltern information region 28 located at an inner periphery side in comparison with the first subaltern information region 27, wherein disk control information including key information for deciphering the data information is divided and recorded in the first and second subaltern information regions 27,28. Hereupon, in the second subaltern information region 28, there are formed a disk judging code (for example, bar code) indicating that

the DVD disk is a writable DVD disk, positional information of the first subaltern information region 27, and so on. Thus, in the DVD player, it is judged whether the DVD disk is writable or not, in accordance with existence of the disk judging code.

As described above, in the DVD player according to Embodiment 3, it is detected whether the disk judging code exists or not in the second subaltern information region 28. If the disk judging code is detected, it is judged that the DVD disk 1 is a writable optical disk. Then, if the data information is protected by the copyright, the playback of the DVD disk is prevented. Therefore, an illegal use of the DVD disk, which infringe the copyright, may be effectively prevented in the physical or electrical manner. It is probable that if an illegal first subaltern information region is recorded in the main information region, the disk control information such as the key information or the like may be illegally copied so that the ciphered data may be demodulated. However, if the second subaltern information region, which is located at the most inner position, is formerly read, the normal position of the first subaltern information region can be identified in the present invention so that the illegal copy may be prevented. Hereupon, the key information may be recorded in the second subaltern information region.

(Embodiment 4)

Hereinafter, Embodiment 4 will be described while taking the case that a DVD disk is played back, fundamentally, with reference to Fig. 3 described above and Fig. 8. In Embodiment 4, it is judged whether a DVD disk to be played back is a writable DVD disk or not, in accordance with whether pre-pits exist in a subaltern information region.

As shown in Fig. 3, in Embodiment 4, the disk judging means 14 composing the second control means 9 judges whether the pre-pits exist or not in the subaltern information region, on the basis of the signal inputted from the demodulation means 7. The other construction is as same as that of the DVD player according to Embodiment 1 (Fig. 1). The concrete construction of the pre-pits will be described later (see Fig. 8).

Thus, in the DVD player according to Embodiment 4, the protective condition judging means 13 composing the the second control means 9 extracts and judges a code indicating existence of the copyright protection from the disk control information in the detected signals which are demodulated, while the disk judging means 14 judges whether the DVD disk is a writable DVD disk or not, in accordance with existence of the pre-pits and pre-pit information. The playback preventing means 15 receives the judgement results of the

protective condition judging means 13 and the disk judging means 14, and then prevents the signal obtained by demodulating the data information from being outputted from the output means 8 if the data information is protected by the copyright and if the DVD disk is writable.

Fig. 8 is a partially sectioned perspective view of a write-once DVD disk provided with pre-pits. As shown in Fig. 8, in the DVD disk 1d, pre-pits 29 are provided in the subaltern information region of the substrate 20. Thus, in the DVD player, it is judged whether the DVD disk is writable or not, in accordance with existence of the pre-pits 29.

As described above, in the DVD player according to Embodiment 4, it is detected whether the pre-pits 29 exist or not in the subaltern information region. If the pre-pits 29 are detected, it is judged that the DVD disk 1 is a writable optical disk. Then, if the data information is protected by the copyright, the playback of the DVD disk is prevented. Therefore, an illegal use of the DVD disk, which infringe the copyright, may be effectively prevented in the physical or electrical manner.

(Embodiment 5)

Hereinafter, Embodiment 5 will be described while taking the case that a DVD disk is played back, fundamentally, with reference to Fig. 4. In Embodiment 5,



it is judged whether a DVD disk to be played back is a writable DVD disk or not, on the basis of a plurality of elements in the group of a wobble, a sub-groove portion, a disk judging code and pre-pits. Hereupon, fundamental portions in Fig. 4 are common with those in Fig. 1. Therefore, in order to avoid duplicated descriptions, the members or elements, which are common with the both figures, are given the same reference numbers, and then the description as to the members or elements are omitted.

As shown in Fig. 4, in Embodiment 5, the wobble detecting means 10 is provided as same as the case of Embodiment 1, and further the sub-groove portion detecting means 11 is provided as same as the case of Embodiment 2. Moreover, the disk judging means 14 composing the second control means 9 can judge existence of each of the disk judging code and the pre-pits as same as the case of Embodiments 3,4. The other construction is as same as that of the DVD player according to Embodiment 1 (Fig. 1).

Thus, in the DVD player according to Embodiment 5, it is judged whether the DVD disk 1 is a writable DVD disk or not, on the basis of a plurality of elements in the group of existence of the wobble, existence of the sub-groove portion, existence of the disk judging code and existence of the pre-pits. Therefore, the accuracy of the judgement of the disk type may be improved in comparison with the cases of

Embodiments 1 to 4 so that an illegal use of the DVD disk, which infringes the copy right, may be prevented more effectively.

As described above, in the optical disk according to the present invention, it is detected at least one of whether the groove is provided with the wobble or not, whether the subaltern information region is provided with the sub-groove portion which connects the predetermined portion of the groove to the adjacent portion of the groove or not, and whether the second subaltern information region, which is different from the ordinary subaltern information region, is provided with the code indicating that the optical disk is writable. If at least one of the wobble, the sub-groove portion and the code is detected, it is judged that the optical disk is writable. Then, if the data information is protected by the copyright, the playback or copy of the optical disk is prevented. Therefore, an illegal use of the optical disk, which infringes the copyright, may be effectively prevented in the physical or electrical manner.

#### Industrial Applicability

As described above, the optical disk, the apparatus for playing back and apparatus for copying the optical disk, and the method of preventing the illegal use of the optical

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## CLAIMS

1. An apparatus for playing back an optical disk having a groove, which includes a main information region in which ciphared data information is recorded in the groove, and a  
5 subaltern information region for recording disk control information including key information for deciphering the data information, which comprises:

a protective condition judging means for judging whether the data information is protected by a copyright or  
10 not on the basis of the disk control information when the data information is played back;

a disk judging means for judging whether the optical disk is writable or not on the basis of other information than the disk control information when the data information  
15 is played back; and

a disk playback preventing means for preventing the optical disk from being played back if it is judged that the data information is protected by the copyright by the protective condition judging means and it is judged that the  
20 optical disk is writable by the disk judging means.

2. The apparatus for playing back the optical disk according to claim 1, wherein the optical disk is a write-once optical disk.

3. The apparatus for playing back the optical disk  
25 according to claim 2, wherein the disk playback preventing

means prevents the optical disk from being played back by preventing the data information from being deciphered.

4. The apparatus for playing back the optical disk according to any one of claims 1 to 3, wherein the disk  
5 judging means detects whether the groove is provided with a wobble or not, and then judges that the optical disk is writable if the wobble is detected.

5. The apparatus for playing back the optical disk according to any one of claims 1 to 3, wherein the disk  
10 judging means detects whether the subaltern information region is provided with a sub-groove portion which connects a predetermined portion of the groove to an adjacent portion of the groove or not, and then judges that the optical disk is writable if the sub-groove portion is detected.

15 6. The apparatus for playing back the optical disk according to any one of claims 1 to 3, wherein the disk judging means detects whether another subaltern information region provided on the optical disk, which is different from said subaltern information region, is provided with a code  
20 indicating that the optical disk is writable, or not, and then judges that the optical disk is writable if the code is detected.

7. The apparatus for playing back the optical disk according to any one of claims 1 to 3, wherein the disk  
25 judging means detects at least one of whether the groove is

provided with a wobble or not, whether the subaltern information region is provided with a sub-groove portion which connects a predetermined portion of the groove to an adjacent portion of the groove or not, and whether another  
5 subaltern information region provided on the optical disk, which is different from said subaltern information region, is provided with a code indicating that the optical disk is writable, or not, and then judges that the optical disk is writable if at least one of the wobble, sub-groove portion  
10 and the code is detected.

8. An apparatus for copying ciphered data information recorded in a first optical disk to a second optical disk of writable type, the first optical disk having a main information region for recording the ciphered data  
15 information and a subaltern information region for recording disk control information including key information for deciphering the ciphered data information, the apparatus comprising:

a protective condition judging means for judging  
20 whether the data information is protected by a copyright or not on the basis of the disk control information when the data information is copied; and

a disk copy preventing means for preventing the data information recorded in the first optical disk from being  
25 copied to the second optical disk if it is judged that the

data information is protected by the copyright by the protective condition judging means.

9. The apparatus for copying the optical disk according to claim 8, wherein the second optical disk is a write-once optical disk.

10. The apparatus for copying the optical disk according to claim 8 or 9, wherein the disk copy preventing means prevents the data information from being copied by preventing the data information from being deciphered.

11. An optical disk of writable type comprising:

a main information region for recording ciphered data information, the data information being recorded in a recording layer within a groove extending along a spiral track, in such a manner that the data information can be read using light;

a first subaltern information region located at an inner periphery side in comparison with the main information region; and

a second subaltern information region located at an inner periphery side in comparison with the first subaltern information region, wherein

a disk control information recorded in a subaltern information region of a read only optical disk is prevented from being copied to the first subaltern information region, by dividing disk control information including key

information for deciphering the data information into two parts, and recording the parts in the first subaltern information region and the second subaltern information region, respectively.

5 12. The optical disk according to claim 11, wherein the optical disk is a write-once optical disk.

10 13. The optical disk according to claim 12, wherein the disk control information including the key information for deciphering the data information is recorded in the first subaltern information region, while at least positional information of the first subaltern information region is recorded in the second subaltern information region.

15 14. The optical disk according to any one of claims 11 to 13, wherein the disk control information in the first subaltern information region and the disk control information in the second subaltern information region are formed by means of different recording methods to each other.

20 15. The optical disk according to claim 14, wherein the disk control information in the first subaltern information region is formed by means of pre-pits.

16. The optical disk according to claim 14, wherein the disk control information in the second subaltern information region is formed by means of a laser trimming process.

17. An optical disk of writable type comprising:

25 a main information region for recording ciphered data



information, the data information being recorded in a recording layer within a groove extending along a spiral track, in such a manner that the data information can be read using light;

5       a first subaltern information region located at an inner periphery side in comparison with the main information region; and

10       a second subaltern information region located at an inner periphery side in comparison with the first subaltern information region, wherein

15       disk control information recorded in a subaltern information region of a read only optical disk is prevented from being copied to the first subaltern information region or to the main information region, by providing a sub-groove portion, which connects a predetermined portion of the groove to an adjacent portion of the groove, in the first subaltern information region.

18. The optical disk according to claim 17, wherein the optical disk is a write-once optical disk.

20       19. A method of preventing an illegal use of an optical disk having a groove, which includes a main information region in which ciphered data information is recorded in the groove, and a subaltern information region for recording disk control information including key information for  
25       deciphering the data information, which comprises the steps

of:

judging whether the data information is protected by a copyright or not on the basis of the disk control information when the data information is played back;

5        judging whether the optical disk is writable or not on the basis of other information than the disk control information; and

10        preventing the optical disk from being played back if the data information is protected by the copyright and the optical disk is writable.

20. The method of preventing the illegal use of the optical disk according to claim 19, wherein the optical disk is a write-once optical disk.

15        21. The method of preventing the illegal use of the optical disk according to claim 20, wherein the optical disk is prevented from being played back by preventing the data information from being deciphered.

20        22. The method of preventing the illegal use of the optical disk according to any one of claims 19 to 21, wherein said other information than the disk control information is such information of whether the groove is provided with a wobble or not, while

it is judged that the optical disk is writable if the wobble is detected.

25        23. The method of preventing the illegal use of the optical

disk according to any one of claims 19 to 21, wherein said other information than the disk control information is such information of whether the subaltern information region is provided with a sub-groove portion which connects a predetermined portion of the groove to an adjacent portion of the groove or not, while

it is judged that the optical disk is writable if the sub-groove portion is detected.

24. The method of preventing the illegal use of the optical disk according to any one of claims 19 to 21, wherein said other information than the disk control information is such information of whether another subaltern information region which is different from said subaltern information region, is provided with a code indicating that the optical disk is writable, or not, while

it is judged that the optical disk is writable if the code is detected.

25. The method of preventing the illegal use of the optical disk according to any one of claims 19 to 21, wherein said other information than the disk control information is at least one in such information set of whether the groove is provided with a wobble or not, whether the subaltern information region is provided with a sub-groove portion which connects a predetermined portion of the groove to an adjacent portion of the groove or not, and whether another

subaltern information region which is different from said subaltern information region, is provided with a code indicating that the optical disk is writable, or not, while

it is judged that the optical disk is writable if at least one of the wobble, the sub-groove and the code is detected.

26. A method of preventing an illegal use of optical disks when ciphered data information recorded in a first optical disk is copied to a second optical disk of writable type, the first optical disk having a main information region for recording the ciphered data information and a subaltern information region for recording disk control information including key information for deciphering the ciphered data information, the method comprising the steps of:

judging whether the data information is protected by a copyright or not on the basis of the disk control information; and

preventing the data information recorded in the first optical disk from being copied to the optical disk of writable type if the data information is protected by the copyright.

27. A method of preventing an illegal use of an optical disk of writable type having a main information region for recording ciphered data information which is recorded in a recording layer within a groove extending along a spiral

track in such a manner that the data information can be read using light, a first subaltern information region located at an inner periphery side in comparison with the main information region, and a second subaltern information region located at an inner periphery side in comparison with the first subaltern information region, the method comprising the step of:

preventing disk control information recorded in a subaltern information region of a read only optical disk from being copied to the first subaltern information region of the optical disk of writable type, by previously forming the disk control information of the first subaltern information region by means of pre-pits.

28. A method of preventing an illegal use of an optical disk of writable type having a main information region for recording ciphered data information which is recorded in a recording layer within a groove extending along a spiral track in such a manner that the data information can be read using light, a first subaltern information region located at an inner periphery side in comparison with the main information region, and a second subaltern information region located at an inner periphery side in comparison with the first subaltern information region, the method comprising the step of:

preventing disk control information recorded in a

subaltern information region of a read only optical disk from being copied to the first subaltern information region of the optical disk of writable type, by providing a sub-groove, which connects a predetermined portion of the groove to an adjacent portion of the groove, in the first subaltern information region.

29. The method of preventing the illegal use of the optical disk according to any one of claims 26 to 28, wherein the optical disk is a write-once optical disk.

30. A method of preventing an illegal use of an optical disk of writable type having a main information region for recording ciphered data information which is recorded in a recording layer within a groove extending along a spiral track in such a manner that the data information can be read using light, a first subaltern information region located at an inner periphery side in comparison with the main information region, and a second subaltern information region located at an inner periphery side in comparison with the first subaltern information region, the method comprising the steps of:

preventing disk control information recorded in a subaltern information region of a read only optical disk from being copied to the first subaltern information region of the optical disk of writable type, by previously forming the disk control information of the first subaltern

information region by means of pre-pits;

judging whether the data information recorded in the optical disk of writable type is protected by a copyright or not on the basis of the disk control information recorded in the first subaltern information region when the data information is played back; and

preventing the optical disk from being played back if the data information is protected by the copyright.

31. A method of preventing an illegal use of an optical disk of writable type having a main information region for recording ciphered data information which is recorded in a recording layer within a groove extending along a spiral track in such a manner that the data information can be read using light, a first subaltern information region located at an inner periphery side in comparison with the main information region, and a second subaltern information region located at an inner periphery side in comparison with the first subaltern information region, the method comprising the steps of:

preventing disk control information recorded in a subaltern information region of a read only optical disk from being copied to the first subaltern information region of the optical disk of writable type, by providing a sub-groove, which connects a predetermined portion of the groove to an adjacent portion of the groove, in the first

subaltern information region;

judging whether the data information recorded in  
the optical disk of writable type is protected by a  
copyright or not on the basis of the disk control  
5 information recorded in the first subaltern information  
region when the data information is played back; and

preventing the optical disk from being played back if  
the data information is protected by the copyright.

32. The method of preventing the illegal use of the optical  
10 disk according to claim 30 or 31, wherein the optical disk  
is a write-once optical disk.

33. The method of preventing the illegal use of the optical  
disk according to claim 32, wherein the optical disk is  
prevented from being played back by preventing the data  
15 information from being deciphered.



## ABSTRACT

In a DVD player, when data information in a DVD disk 1 is played back, it is judged whether the data information is protected by a copyright or not on the basis of disk control information. Further, it is judged whether the DVD disk 1 is writable or not, based on whether the DVD disk 1 is provided with a wobble or not. Thus, if the data information is protected by the copyright and the DVD disk 1 is writable, a playback of the DVD disk 1 is prevented so that an illegal use of the DVD disk 1, which infringes the copyright, is effectively prevented.

**Fig. 1**

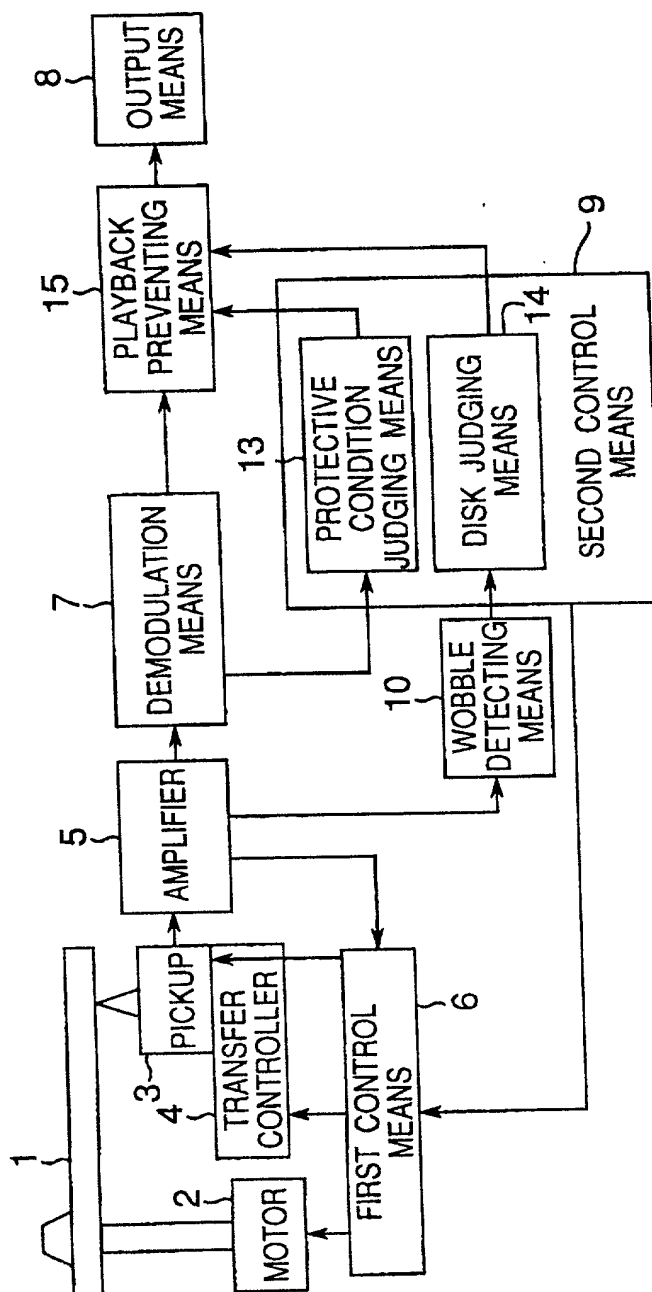


Fig.2

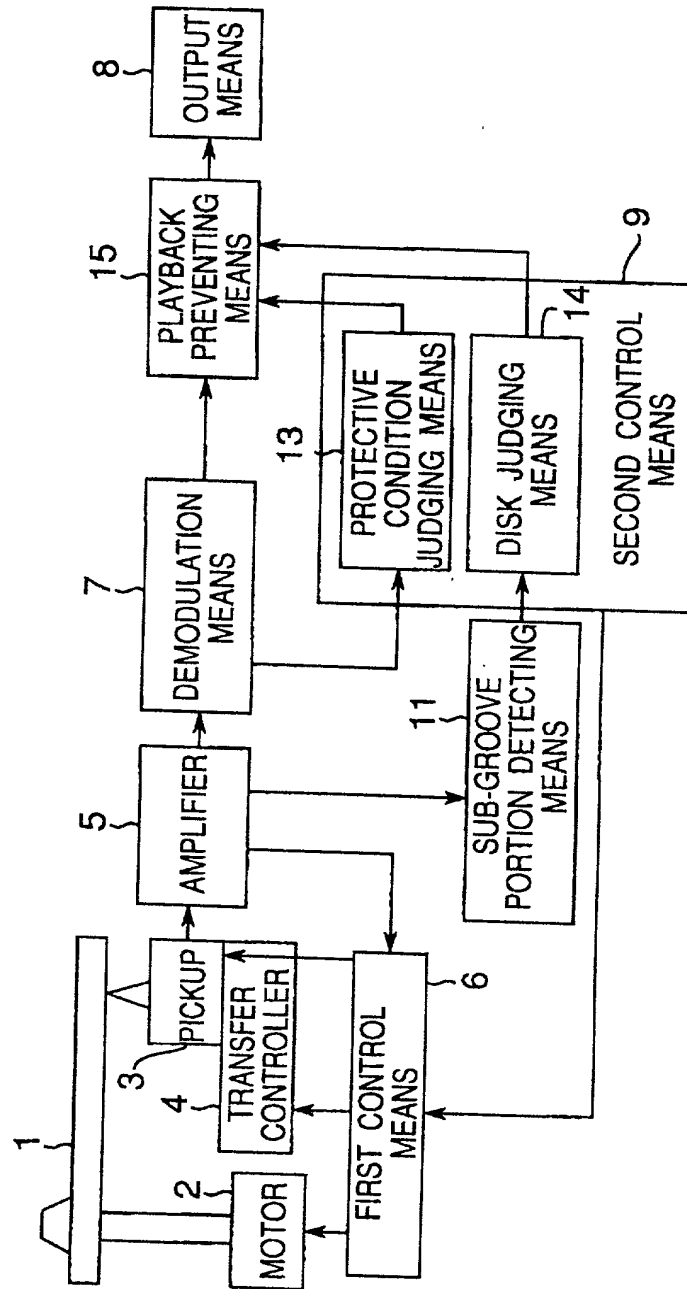


Fig.3

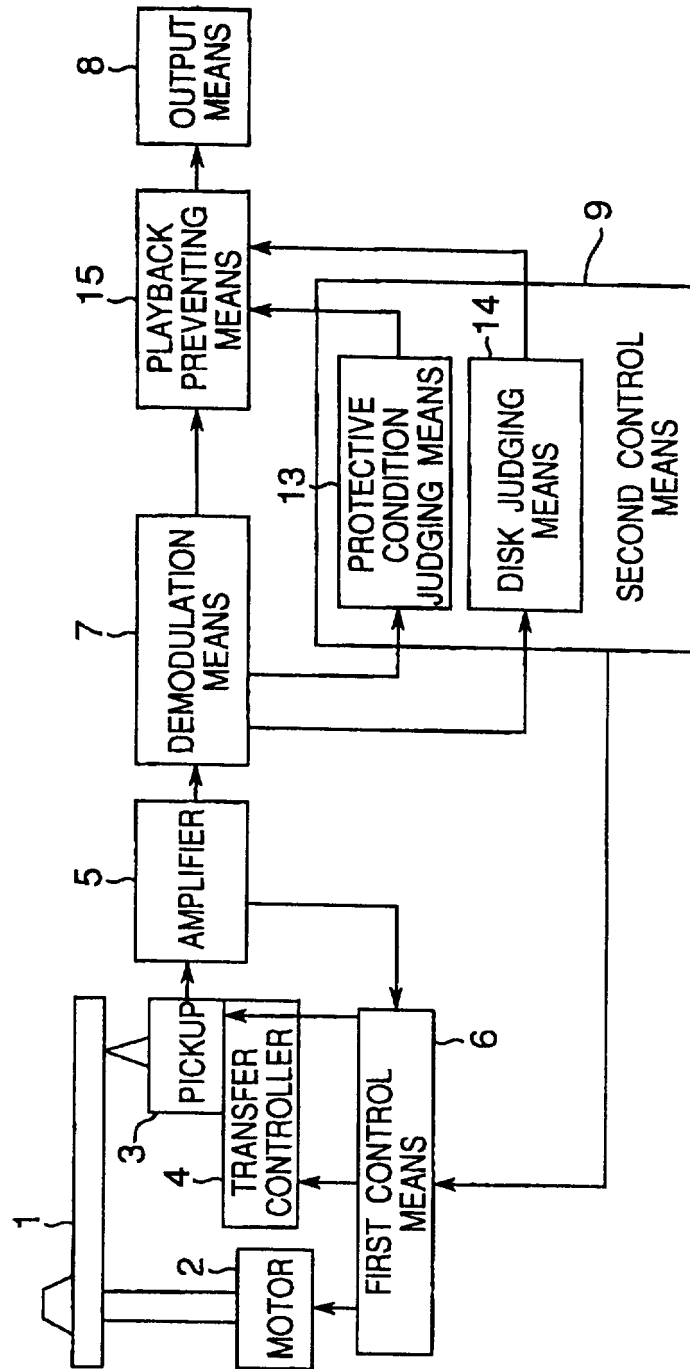


Fig. 4

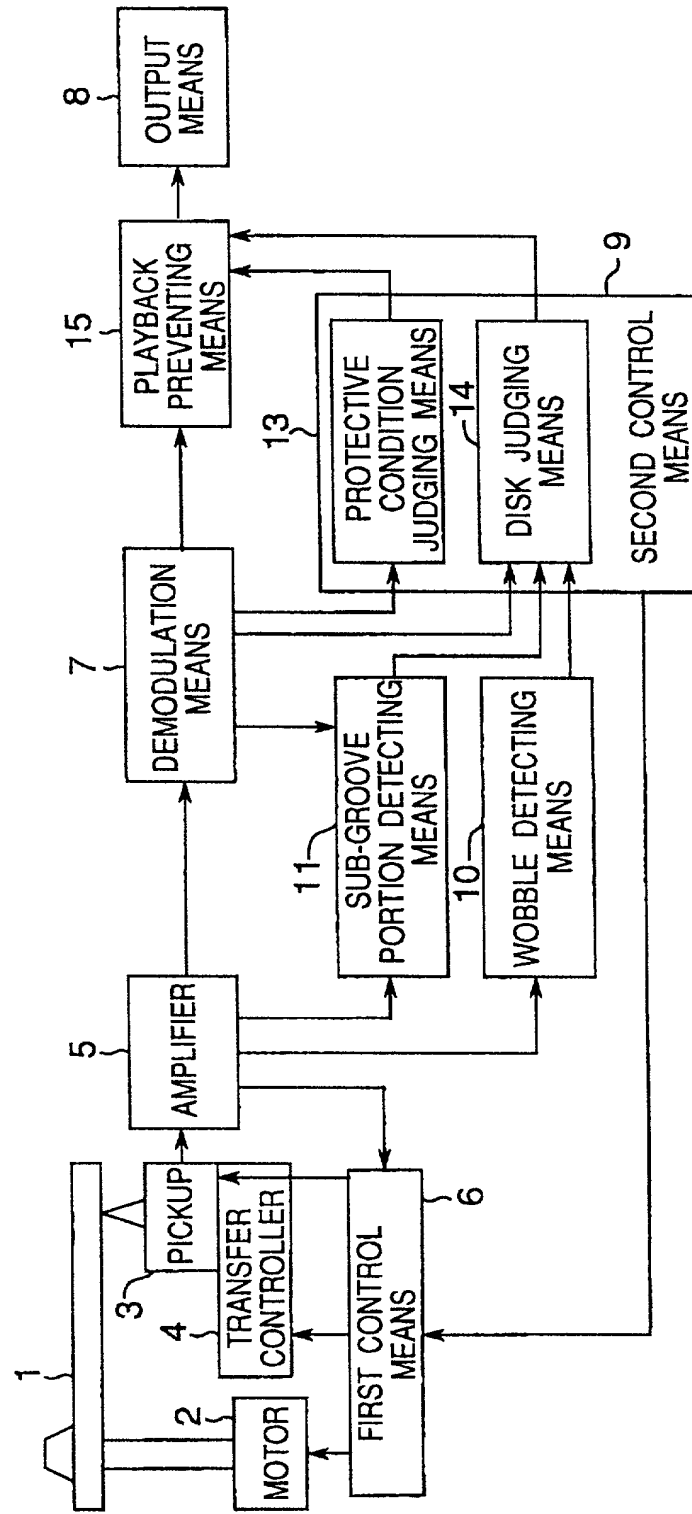


Fig. 5

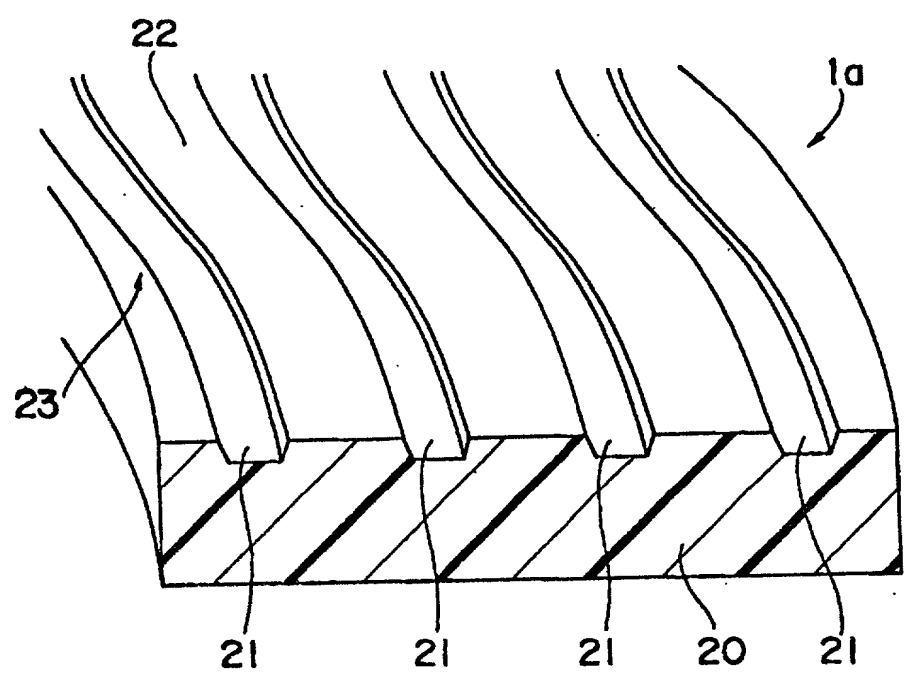
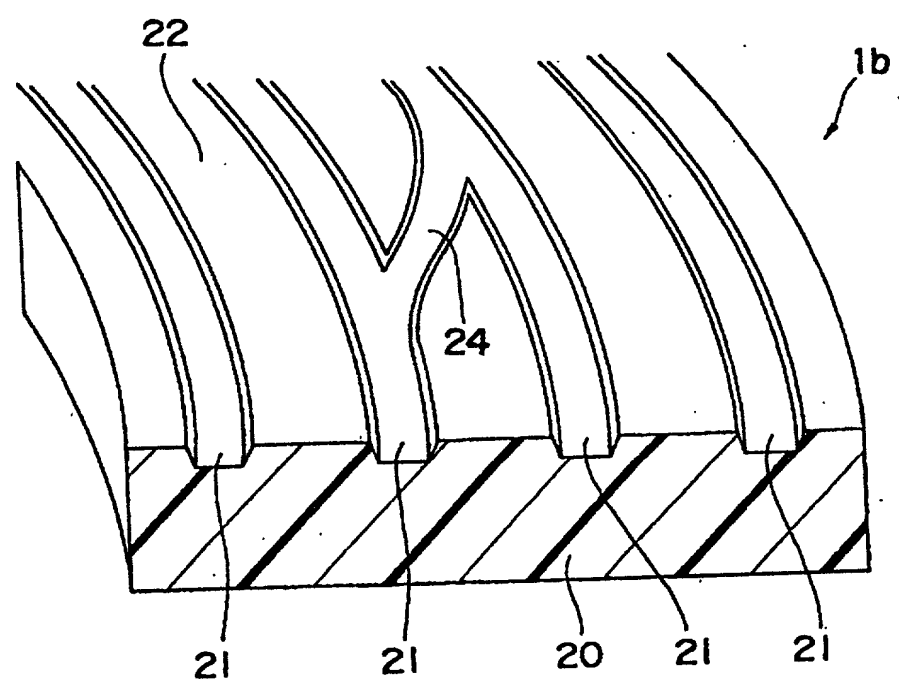
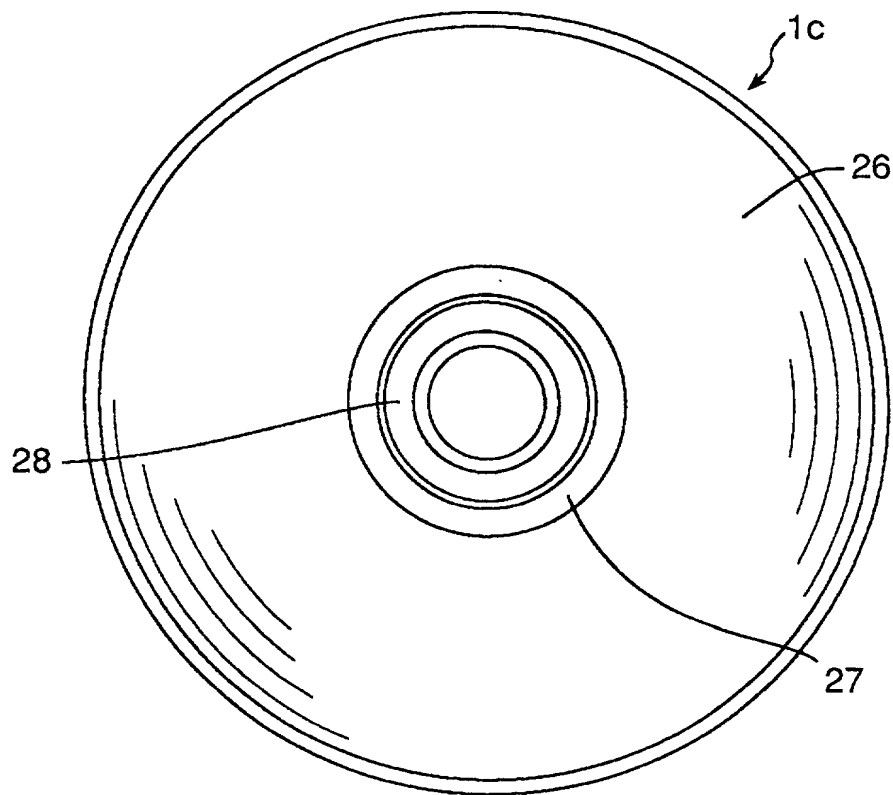
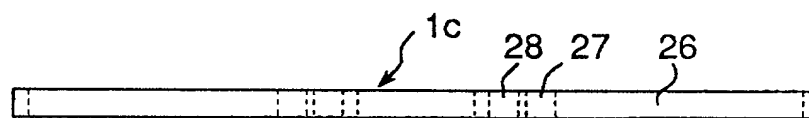


Fig. 6



*Fig.7A**Fig.7B*

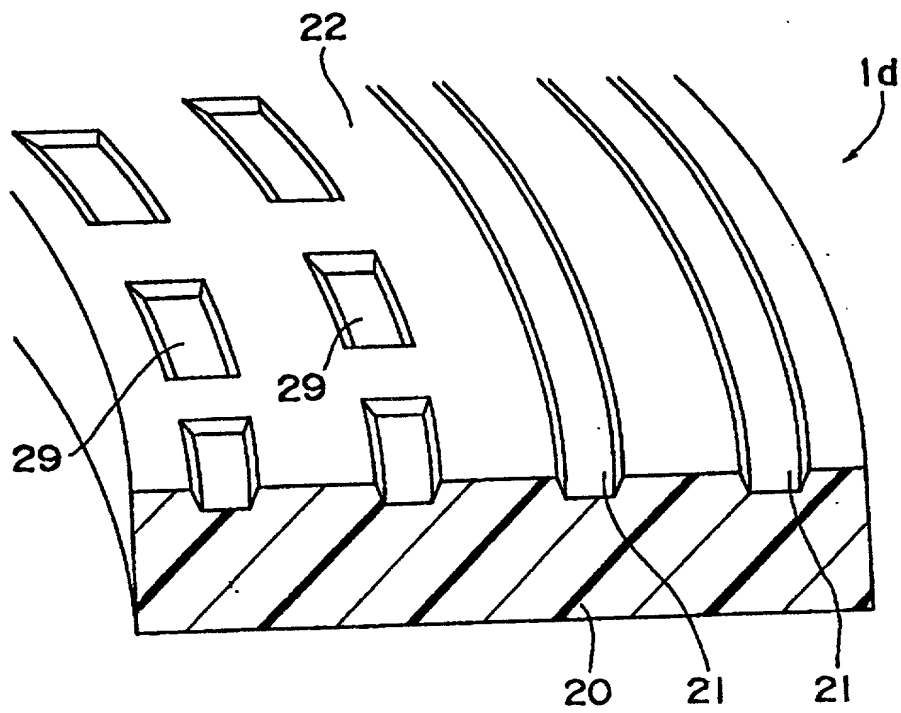
*Fig. 8*



Fig. 9

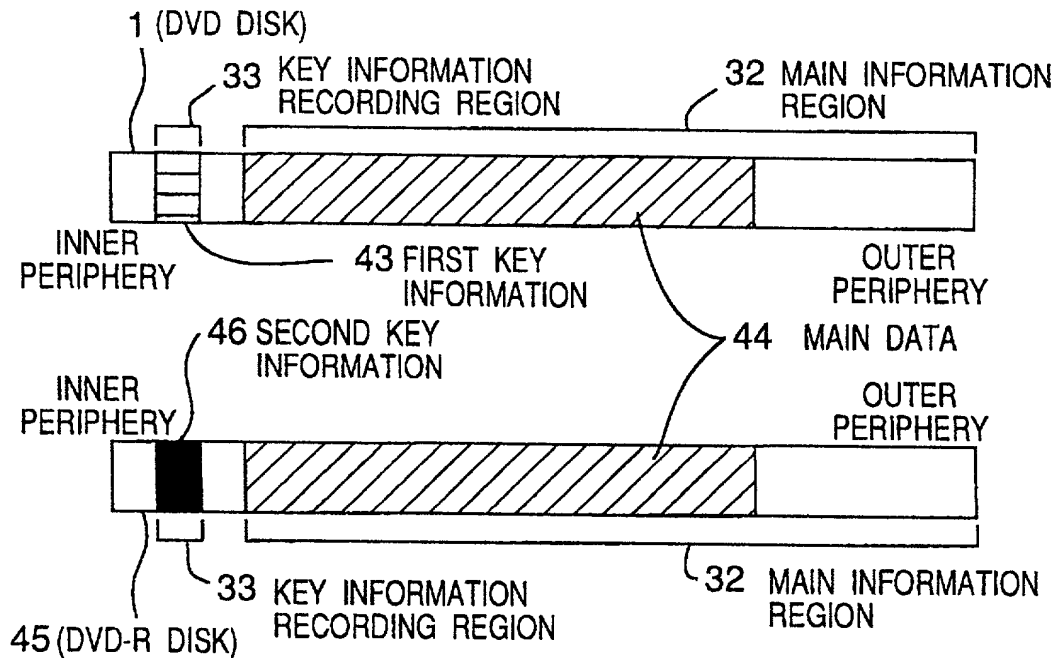


Fig. 10

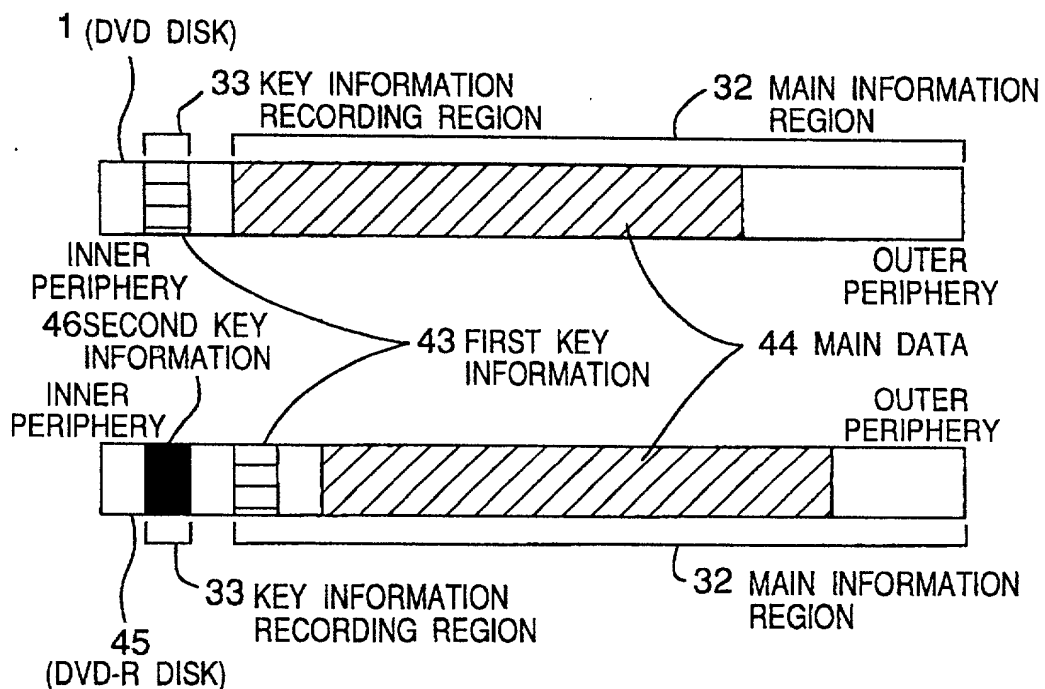


Fig. 11

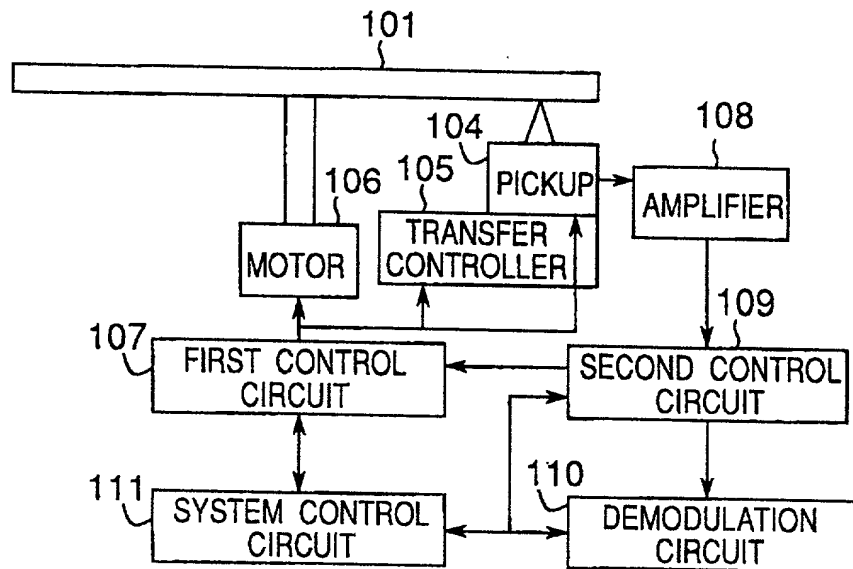
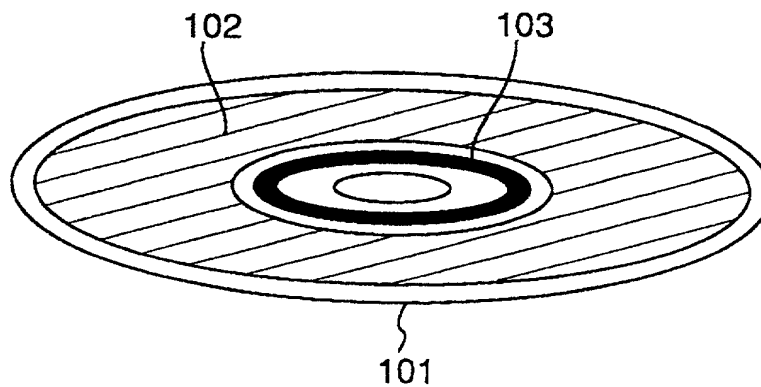


Fig. 12



## DECLARATION AND POWER OF ATTORNEY FOR U.S. PATENT APPLICATION

米国特許出願宣言書及び委任状

Japanese Language Declaration

日本語宣言書 (英語でご記入下さい)

As a below named inventor, I hereby declare that: my residence, post office address and citizenship are as stated below next to my name; that I verily believe that I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

下記の氏名の発明者として、私は以下の通り宣言します。私の住所、郵便物送付先、国籍は下記の私の氏名の後に記載された通りです。下記の名称の発明に関して請求の範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者（下記の氏名が複数の場合）であると信じています。

OPTICAL DISK, APPARATUS FOR PLAYING BACK AND APPARATUS FOR COPYING

Title (発明の名称) : OPTICAL DISK AND METHOD OF PREVENTING ILLEGAL USE OF OPTICAL DISK

of which is described and claimed in:

上記名称の発明を記述し特許請求する書類は、以下のいずれかです。

- ( ) the attached specification, or  
本状に添付した明細書
- ( ) the specification in the application Serial No. \_\_\_\_\_ filed \_\_\_\_\_;  
(上記日付) 提出の米国出願番号 (上記出願番号) で、  
and with amendments through \_\_\_\_\_ (if applicable), or  
(該当する場合) (上記日付等) に訂正された明細書
- (X) the specification in International Application No. PCT/JP99/06102, filed November 2, 1999,  
and as amended on \_\_\_\_\_ (if applicable).  
(上記日付) 提出の特許協力条約に基づく国際出願番号PCT/ (上記出願番号) で、  
(該当する場合) (上記日付等) に訂正された明細書

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment(s) referred to above.

私は、特許請求の範囲を含む上記訂正後の明細書を検討し、内容を理解していることをここに表明します。

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR §1.56.

私は、連邦規則法典第37編第1条56項に定義されるとおり、特許性の有無について重要な情報を開示する義務があることを認めます。

I hereby claim priority benefits under Title 35, United States Code, §119 (and §172 if this application is for a Design) of any application(s) for patent or inventor's certificate listed below and have also identified below any application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

私は、米国法典第35編119条（もし本願が意匠に関する出願の場合は172条）に基づき、下記の特許出願又は発明者証の出願についての優先権の利益をここに主張するとともに、優先権主張の基礎となる出願日を有する、本出願の前に出願された特許または発明者証の出願を以下にすべて、枠内をマークすることで示しています。

| COUNTRY<br>国名 | APPLICATION NO.<br>出願番号 | DATE OF FILING<br>出願日 | PRIORITY<br>CLAIMED<br>優先権主張 |
|---------------|-------------------------|-----------------------|------------------------------|
| Japan         | 10-312222               | November 2, 1998      | Yes                          |
|               |                         |                       |                              |
|               |                         |                       |                              |
|               |                         |                       |                              |
|               |                         |                       |                              |
|               |                         |                       |                              |

I hereby claim the benefit under Title 35, United States Code §120 of any United States application(s), or 365(c) of any PCT international application designating the United States listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code §112, I acknowledge the duty to disclose information material to patentability as defined in Title 37, Code of Federal Regulations, §1.56 which become available between the filing date of the prior application and the national or PCT international filing date of this application:

私は、米国法典第35編120条に基づいて下記の米国特許出願、又は米国を指定している特許協力条約365条(c)に基づく優先権をここに主張します。また、本出願の各請求の範囲の技術的事項が米国法典第35編112条第1段で規定された方法で先行する米国特許出願に開示されていない限り、当該先行出願の出願日以降で本出願の国内又はPCTに基づく国際出願の提出日までの期間中に入手できるようになった、連邦規則法典第37編1条56項で定義された特許性の有無に関する重要な情報について、開示義務があることを認識しています。

| APPLICATION SERIAL NO.<br>出願番号 | U.S. FILING DATE<br>米国出願日 | STATUS: PATENTED, PENDING,<br>ABANDONED<br>現状:特許許可済、係属中、放棄済 |
|--------------------------------|---------------------------|---|
|                                |                           |   |
|                                |                           |   |
|                                |                           |   |

I further declare that all statements made herein of my own knowledge are true, and that all statements on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

私は、私自身の知識に基づいて本宣言書中で私が行う表明が真実であり、かつ私の入手した情報と私の信じることに基づく表明がすべて真実であると信じていること、さらに故意になされた虚偽の表明及びそれと同等の行為は米国法典第18編第1001条に基づき、罰金または拘禁、もしくはその両方により処罰されること、そしてそのような故意による虚偽の声明を行えば、出願した、又は既に許可された特許の有効性が失われることを認識し、よってここに上記のごとく宣誓を致します。

And I hereby appoint Michael R. Davis, Reg. No. 25,134; Matthew M. Jacob, Reg. No. 25,154; Jeffrey Noltan, Reg. No. 25,408; Warren M. Cheek, Jr., Reg. No. 33,367; Nils E. Pedersen, Reg. No. 33,145; and, Charles R. Watts, Reg. No. 33,142, who together constitute the firm of WENDEROTH, LIND & PONACK, L.L.P., jointly and severally, attorneys to prosecute this application and to transact all business in the U.S. Patent and Trademark Office connected therewith.

私は、本出願に関する一切の手続きを米特許商標局に対して遂行する弁護士として、共同でWENDEROTH, LIND & PONACK, L.L.P.法律事務所を構成しているMichael R. Davis (登録番号第25,134号)、Matthew M. Jacob (登録番号第25,154号)、Jeffrey Noltan (登録番号第25,408号)、Warren M. Cheek, Jr. (登録番号第33,367号)、Nils E. Pedersen (登録番号第33,145号) 及びCharles R. Watts (登録番号第33,142号) を指名いたします。

I hereby authorize the U.S. attorneys named herein to accept and follow instructions from AOYAMA & PARTNERS as to any action to be taken in the U.S. Patent and Trademark Office regarding this application without direct communication between the U.S. attorneys and myself. In the event of a change in the persons from whom instructions may be taken, the U.S. attorneys named herein will be so notified by me.

私は、本願に関して米国特許商標局で行われるあらゆる手続行為に関し、ここに指名した米国弁護士を、弁護士と私との間で直接連絡をとることなく、(米国弁護士が連絡する相手先。譲受人もしくは日本の代理人等)からの指示を受けそれに従うことを、ここに承認します。指示を送る者が変更される場合は、その旨を上記米国弁護士は私から告知されます。

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The above application may be more particularly identified as follows:

上記出願は、さらに具体的には以下のように特定されます。

U.S. Application Serial No. \_\_\_\_\_ Filing Date June 30, 2000  
(上記出願日) 提出の米国特許出願第 (上記出願番号) 号

Applicant Reference Number 531491 Atty Docket No. \_\_\_\_\_  
出願人側整理番号 (上記番号) 米国弁護士側管理番号 (上記番号)

Title of Invention OPTICAL DISK, APPARATUS FOR PLAYING BACK AND APPARATUS FOR COPYING  
発明の名称 OPTICAL DISK AND METHOD OF PREVENTING ILLEGAL USE OF OPTICAL DISK